İSTANBUL UNIVERSITY PRESS

EISSN 2602-473X

AQUATIC SCIENCES AND ENGINEERING

Aquat Sci Eng 2021; 36(1): 34-37 • DOI: https://doi.org/10.26650/ASE2020708760

Short Communication

Subcutaneous Infiltrative Lipoma in a Cultured European Seabass (*Dicentrarchus labrax*)

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Cite this article as: Urku, C. (2021). Subcutaneous infiltrative lipoma in a cultured european seabass (*Dicentrarchus labrax*). *Aquatic Sciences and Engineering, 36*(1), 34-37.

ABSTRACT

ILipomas are soft tissue mesenchymal benign tumors divided into two groups: infiltrative and non-infiltrative. In an outside examination of the body of cultured European seabass (*Dicentrarchus labrax*) obtained from an inland fish farm located in the Turkish Aegean Coast One tumor-like structure was observed on the dorsal side of the back, leading to deformation of the skin surface. It had been not reported in clinical findings and data for diseases and mortality in the fish farm. In the histopathological examination, the tumor (neoplasia) was diagnosed as a subcutaneous infiltrative lipoma. Histologically, the mass was characteristic of a benign tumor, which constituted well-differentiated adipocytes, showing a tendency to invade the underlying musculature. This study described for the first time lipomas in cultured sea bass in Turkey, which could be used to extend the existing information about benign tumors.

Keywords: Seabass, *Dicentrarchus labrax*, lipoma, tumor, histopatholo

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Submitted:
27.03.2020

Revision Requested:
07.05.2020

Last Revision Received:
26.05.2020

Accepted:
30.05.2020

Online published:
07.10.2020

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INTRODUCTION

Lipomas are benign tumors of mesenchymal origin common in mammals in almost every organ (Colella, Lanza, Rossiello, & Rossiello, 2004; Ezirmik & Yildiz, 2011; Pricop et al., 2018; Tong, Seltzer, & Castle, 2020). In fish, they have been classified into two groups: infiltrative and non-infiltrative. The first one involves tumors, which characteristically infiltrate adjacent tissues, tend to recur after excision (Enzinger & Weiss, 2000) and are quite a rare type in fish (Schlumberger & Lucke, 1948; Martineau & Ferguson, 2006; Roberts, 2012). Usually, they have been reported in few species of freshwater and marine fish such as channel catfish, *Ictalurus punctatus* (McCoy, Bowser, Steeby, Bleau, & Schwedler, 1985); European eel, *Anguilla anguilla* (Easa, Faisal, Harshbarger, & Hetrick, 1989); cultured striped seabream, *Lithognathus mormyrus* (Volpatti et al., 1998) bluefin tuna, *Thunnus thynnus* (Marino, Monaco, Salvaggio, & Macrì, 2006); molly, *Poecilia velifera*, (Stefano, Bonfiglio, Montalbano, Giorgianni, & Lanteri, 2012) and Mediterranean seabass, *Dicentrarchus labrax* (Marino, Chiofalo, Mazzullo, & Panebianco, 2011).

European seabass is one of the most economically important fish species in the Mediterranean region (Afonso, Games, da Silva, Marques, & Henrique 2005; Alpbaz, 2005). According to 2018 TUIK data, seabass is in the first place, with 116.915 tons of aquaculture production (TUIK, 2018). In Turkey, inland fish farms known as aquaculture facilities producing marine fish are most commonly located in Aegean Region (Gullu, 2012). The inland fish farms located in the Muğla province are of great importance with regard to cultured marine fish (Ercan, Sunar, & Başer, 2012).

The present study aimed to provide a histological characterization of a subcutaneous infiltrative lipoma observed in the cultured European seabass from the Aegean Region in Turkey.

MATERIALS AND METHODS

An adult European seabass was obtained from the inland fish farm, located in the Turkish Aegean coast. The fish was transported in a conveying box to the laboratory of fish disease of the Faculty of Aquatic Science, Istanbul University for a histopathological examination of a recent tumor-like structure, located on the dorsal side of the back. It had been not reported in clinical findings and data for diseases and mortality in an inland pond by the management of the fish farm.

After the body weight and length were measured (approx. 100 g and 13 cm), the fish was prepared for histopathological analysis. Fixing (10 % buffered formalin) cut section of the tumor- like structure was soft. Pathological muscular tissue was processed for histopathology by fixing it in 10 % buffered formalin, and processed for paraffin embedding. The obtained sections (4-5 µm) were stained with hematoxylin and eosin (H&E), and examined by light microscopy for determination of the tumor- like structure (Bullock, 1978; Roberts, 2012).

RESULTS AND DISCUSSION

The characteristics described by histopathological examinations were consistent with a diagnosis of subcutaneous infiltrative lipoma in cultured European seabass in Turkey.

The European seabass had a single tumor-like structure on the dorsal side of the back, deforming the skin surface. Microscopically, thinning of the epidermis was detected, the mass consisted of well-differentiated adipocytes with single large fat vacuoles and flat nuclei, pushed to the periphery of the cells. The tumors were not encapsulated and frequently infiltrated between and around the subcutaneous skeletal muscle bundles (Figure1, Figure 2). Based on the characteristic histological features, the tumor-like structure was identified as a subcutaneous infiltrative lipoma.

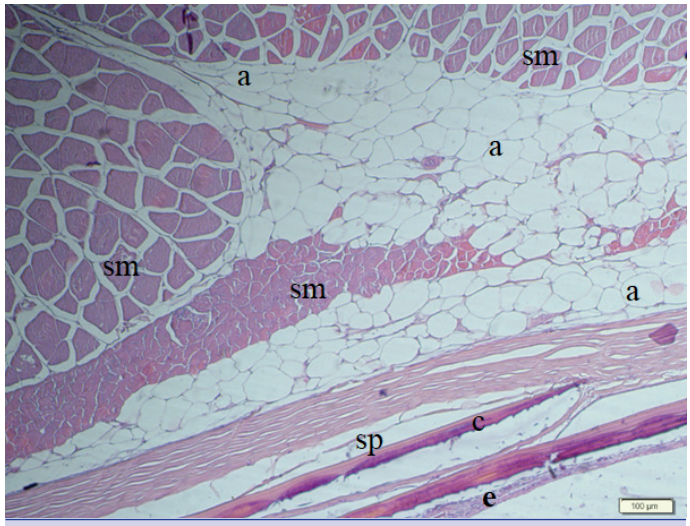

Figure 1. Histological section of a lipoma from a seabass showing separation of the dermis from underlying trunk muscles a: adipocyte; c: scale, e: epidemis, sp: scale pocket, sm: skeletal muscle (H&E).

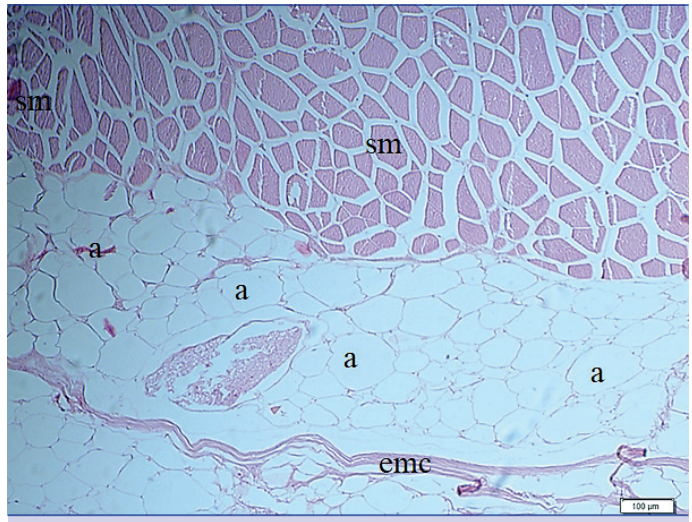

Figure 2. Entrapped muscle cells by well-differentiated adipocytes **a:** adipocytes, **emc:** entrapped muscle cells, **sm:** skeletal muscle (H&E).

Tumors are generally divided into malignant and benign tumors. The most prominent characteristic of benign tumors is that they do not metastasize (Roberts, 2012). In recent studies, there are reports of benign tumors such as lipomas, adenomas (Gumpenberger, Hochwartner, Loupal, 2004), osteomas (Lima, Souza, Mesquita, Souza & Chinelli, 2002), melanomas (Sweet et al., 2012) and papillomas (Akaylı, Bozkurt, and Urku, 2018) in fish. However, these tumors have been reported to affect a small proportion of the fish population (Marino et al., 2011; Akaylı et al., 2018). It is very important to determine which fish species and which tumors are seen before determining the factors causing tumor formation. It has been reported that the most used method for the purpose of identification is histological methods. Thus, the cellular structure can be observed, and information about the tumor can be obtained (Roberts, 2012). In aquaculture, much attention should be paid as tumors will provide disadvantages for fish. Therefore, there has been an increase in the number of studies on this subject.

Macroscopically, some of the tumors like lipoma detected in fish can be observed on the outer surface of the fish, such as the skin, without an autopsy process (Stefano et al., 2012); while others can only be seen in various internal organs like adenomas with an autopsy (Gumpenberger, Hochwartner, Loupal, 2004; Stilwell et al., 2018).

Marino et al. (2011) reported that there was a significant deformation in the skin of sea bass due to 3 large lipomas, and the epidermis was normal. While it was reported that these lipomas extended to the muscles in the sea bass (Marino et al., 2011); Stefano et al. (2012) reported that the lipomas in guppies have a thin capsule and do not infiltrate to the underlying muscles. In this study, the gross pathology, especially the skin deformation observed in our findings bears similarities to subcutaneous infiltrative lipomas in other fish species such as in cultured Mediterranean seabass *Dicentrarchus labrax* (Marino et al., 2011) and

gold fish *Carassius auratus* (Sood et al., 2017). In addition, in this study, the lipoma extended to the muscles as described by Marino et al. (2011).

Comparing our findings with literature reports about lipomas in marine and freshwater fish, histologically; the tumor-like structure was identified as a benign tumor due to the well- differentiated, sharp tendency to infiltrate the surrounding tissues and non-metastatic characteristic according to the criteria previously described by McCoy et al. (1985) and Marino et al. (2011).

Generally, lipomas have been described in adult animals with the incidence increasing with age (Moulton, 1990). Marino et al. (2011) have reported multicentric lipomas seen in seabass. However, in the present study, the lipoma detected in the seabass had a monocentric characteristic. Therefore, we suggest that the number of lipomas may increase in parallel to weight gain in fish.

The etiology of lipoma development is unknown. There are several hypotheses and articles about the etiology of lipomas. There is little research on the possible causes such as an error in fat metabolism (Easa et al., 1989; Pulley & Stannard, 1990), endocrine or neurological dysfunctions (Easa et al., 1989) and also dysmetabolic syndrome (Marino et al., 2011). Unlike tuna (*Thunnus thynnus*), containing dense fat in their muscle, in this study, the dysmetabolic syndrome may induce the lipoma formation in sea bass, as reported by Marino et al. (2011). Although lipoma formation in culture fish is not a problem in terms of the fish production and frequency of the lipomas, comprehensive research should be carried out on the formation of lipomas.

CONCLUSION

There are no reports on subcutaneous infiltrative lipomas in cultured European sea bass originating from an inland fish farm located in the Aegean Region (Turkey). As a result of this study, for the first time, a subcutaneous infiltrative lipoma was detected in cultured European sea bass.

Conflict of interests: There are no conflicts of interest to declare.

Ethics committee approval: Ethics committee approval is not required.

Funding: -

Acknowledgments: -

Disclosure: -

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